1. $Q = AB + B$
2. $Q = C \cdot (A + \bar{C})$
3. $Q = AB\bar{C} + A\bar{C} + \bar{A}\bar{C}D + \bar{A}\bar{C}\bar{D}$
4. $Q = AB(\bar{B} + C) + BC + B$
5. $Q = B(A + \bar{C}) + A + A(\bar{A} + B)$
6. $Q = AB\bar{C} + BC + \bar{A}B\bar{C} + AB\bar{B}$
7. $Q = ABC + BCD + BC\bar{D} + B\bar{C}D + AB\bar{C} + \bar{A}B\bar{C}$
8. $Q = ABCD + ABD + A\bar{B}D + A\bar{B}CD + ACD + \bar{A}CD$
9. $Q = \overline{(A + \bar{B}) \cdot (\bar{A}B)} + \bar{A}B$
10. $Q = \overline{A\bar{C}BD} + \bar{C}D$

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1. $Q = AB + B \cdot 1$

$$B(A + 1)$$
$$B \cdot 1$$
$$\boxed{B}$$

2. $Q = C \cdot (A + \bar{C})$

$$C \cdot A + C\bar{C}$$
$$C A + 0$$
$$\boxed{C \cdot A}$$

3. $Q = AB\bar{C} + A\bar{C} + \bar{A}\bar{C}D + \bar{A}\bar{C}\bar{D}$

$$\bar{C}\left(AB + A + \bar{A}D + \bar{A}\bar{D} \right)$$
$$\bar{C}\left(A + \bar{A}(D + \bar{D}) \right)$$
$$\bar{C}\left(A + \bar{A}(1) \right)$$
$$\boxed{\bar{C}}$$

4. $Q = AB(\bar{B} + C) + BC + B$

$$A \cdot B(\bar{B} + C) + B$$
$$AB\bar{B} + ABC + B$$
$$A \cdot 0 \;\; + ABC + B$$
$$0 + ABC + B$$
$$ABC + B$$
$$\boxed{B}$$

5. $Q = B(A + \bar{C}) + A + A(\bar{A} + B)$

$$B \cdot A + B\bar{C} + A + A\bar{A} + AB$$
$$\underset{0}{A\bar{A}}$$
$$BA + B\bar{C} + A + AB$$
$$B\bar{C} + A + AB$$
$$\boxed{B\bar{C} + A}$$

6. $Q = AB\bar{C} + BC + \bar{A}B\bar{C} + AB\bar{B}$

$$B\left(A\bar{C} + C + \bar{A}\bar{C} + A\bar{B} \right)$$
$$\bar{C}(A + \bar{A})$$
$$\bar{C}$$
$$B\left(\bar{C} + C + A\bar{B} \right)$$
$$B\left(1 + A\bar{B} \right)$$
$$\boxed{B}$$

7. $Q = ABC + BCD + BC\bar{D} + B\bar{C}D + AB\bar{C} + \bar{A}B\bar{C}$

$$B(AC + CD + C\bar{D} + A\bar{C} + \bar{A}\bar{C})$$
$$B\left(C(A + D + \bar{D}) + \bar{C}(A + \bar{A}) \right)$$
$$B\left(C + \bar{C} \right)$$
$$\boxed{B}$$

8. $Q = ABCD + ABD + A\bar{B}D + A\bar{B}CD + ACD + \bar{A}CD$

$$D(ABC + AD + A\bar{B} + A\bar{B}C + AC + \bar{A}C)$$
$$D\left(A(BC + D + \bar{B} + \bar{B}) + C(A + \bar{A}) \right)$$
$$D\left(A + C \right)$$
$$\boxed{D(A + C) = DA + DC}$$

9. $Q = \overline{(A + \bar{B}) \cdot (\bar{A}B)} + \bar{A}B$ $x = A + \bar{B}$
                            $y = A \cdot \bar{B}$

$$\overline{\overline{x} \cdot \overline{y}} + \bar{A}B$$
$$x + y + \bar{A}B$$
$$A + \bar{B} + A\bar{B} + \bar{A}B$$
$$A + \bar{B} + \bar{A}B$$
$$A + \bar{A}B + \bar{B}$$

$$A \cdot 1 + \bar{A}B$$
$$A(B + 1) + \bar{A}B \quad + \bar{B} \qquad \boxed{A + \bar{A}B = A + B}$$
$$AB + A + \bar{A}B \quad + \bar{B}$$
$$B(A + \bar{A})$$
$$B + A \quad + \bar{B}$$
$$A + B + \bar{B} = \boxed{1}$$

10. $Q = \overline{A\bar{C}BD} + \bar{C}D$ $\overline{A\bar{C}B} = x$ $C + \bar{B}$

$$\overline{\overline{x} \cdot D}$$
$$\overline{A\bar{C}B + \bar{D}}$$
$$\bar{B}(\bar{A} + C) + \bar{D}$$
$$\bar{B}\bar{A} + \bar{B}C + \bar{D} \quad + C$$
$$\bar{A}\bar{B} + \bar{B}C + C \quad + \bar{D}$$
$$\boxed{\bar{A}\bar{B} + C + \bar{D}}$$